

Remarks

The Applicants have amended Claim 15 to include selected features of Claim 22. Claim 46 is amended to correct a minor informality. Entry of these amendments into the official file is respectfully requested.

Claim 46 stands objected to because “epoxy” was misspelled. Claim 46 has been amended to correct the spelling of epoxy. Reconsideration and withdrawal of the objection is respectfully requested.

Claims 15, 22 and 46 stand rejected under 35 U.S.C. §103 over the hypothetical combination of Isley, Nishimura ‘506, Lewis, Yamanaka, Noland or Voirol. The Applicants note with appreciation the Examiner’s detailed comments hypothetically applying that complicated combination against Claims 15, 22 and 46. The Applicants nonetheless respectfully submit that one skilled in the art would not make the combination and, in any event, the combination would still fail to teach or suggest the subject matter of amended Claims 15, 22 and 46. Therefore, the Applicants respectfully request reconsideration and withdrawal of the obviousness rejection.

According to the rejection, col. 6, lns. 15-19 and col. 10, lns. 44-58 of Isley disclose that a surface of a reinforcing fiber substrate may be coated with an interlamina-toughened resin. (See page 3 of office action.) The Applicants do not see that disclosure. These portions of Isley arguably disclose only coating a portion of a wall (40) with a resin. However, they do not disclose that the resin is interlamina-toughened. The Applicants believe that finding that Isley discloses an interlamina-toughened resin may have been an inadvertent error because the January 25, 2007 office action did not find that Isley discloses an interlamina-toughened resin. That Action found that Isley discloses a resin, but that it is not interlamina-toughened. Rather, that

Action found that Nishimura '506 implicitly discloses an interlamina-toughened resin and that it would have been obvious to combine the two references. *See* January 25, 2007 office action, pg. 3. Like the January 25, 2007 office action, this rejection found that Nishimura '506 implicitly discloses that its resin is an interlamina-toughened resin because, allegedly, pages 49 and 50 of this Specification disclose that a resin is an interlamina-toughening resin when it is adhered to at least one surface of the substrate and Nishimura '506 discloses that the resin adheres to at least one surface of the substrate.

The Applicants respectfully disagree. The claimed matrix resin used for vacuum assisted injection molding is specified as a thermosetting resin. This clarifies that the subject matter of Claim 15 has, in particular, a high advantage of "interlamina-toughening" by using "thermoplastic polyetherimide, polyphenyleneether or polyethersulfone" as the main constituent of "interlamina-toughening resin material" in a system whose matrix resin is a thermosetting resin.

Although the rejection asserts that the bonding material described in Nishimura '506 corresponds to the interlamina-toughening resin, Nishimura '506's bonding material is different from an engineering plastic having a high glass transition temperature such as "thermoplastic polyetherimide, polyphenyleneether or polyethersulfone" of the Applicants' Claim 15. In particular, Nishimura '506 discloses that its resin is comprised of nylon 12, which has a "relatively low melting point." *See e.g.*, Nishimura '506, col. 3, lns. 61-65, col. 4, lns. 1-5.

Therefore, the resin disclosed in Nishimura '506 does not have the same improved and unexpected properties of the interlamina-toughened resin of the Applicants' claims. The Applicants previously made similar arguments and the January 25, 2007 office action stated that if the bonding material described in Nishimura '506 and the interlamina-toughening resin

material as claimed are different, the Applicants should show the difference by comparative examples in the Specification or a Declaration. The Applicants showed such differences by comparative examples in their May 11, 2007 Response. Now, the Applicants enclose, with this Response, the Declaration of Eisuke Wadahara, a co-inventor and an engineer employed by the assignee, which is also the assignee of Nishimura '506 and Yamanaka.

The Declaration provides that Mr. Wadahara prepared a sample of Nishimura '506's so-called interlamina-toughened resin material using the non-woven Nylon 12 disclosed in Nishimura '506's application, deposited at 10 g/m², instead of the polyethersulfone-epoxy mixture used by the Applicants. In other words, Mr. Wadahara prepared the sample using the same methodology as that used to prepare the sample described in Example 7 of the Specification, but he used Nishimura '506's Nylon 12 deposited at 10 g/m² instead of the polyethersulfone-epoxy mixture used by the Applicants. *See* Declaration of Wadahara, ¶ 3. As provided in the Declaration, the compressive strength after impact at room temperature (CAI) using Nylon 12 (volume fraction (Vf) 55%) was 188 MPa compared to 280 MPa using the polyethersulfone-epoxy mixture (Vf 58%). The compressive strength at room temperature (CS/RT) obtained was 1345 MPa using Nylon 12 (Vf 52%) compared to 1630 MPa using the polyethersulfone-epoxy mixture (Vf 59%). The compressive strength at a high temperature after a hot/wet conditioning (CS/HW) using Nylon 12 (Vf 52%) was 841 MPa compared to 1260 MPa using the polyethersulfone-epoxy mixture (Vf 59%).

Based on the foregoing, Claim 15 has been amended to add elements from Claim 22.

Claim 15 now recites:

when a composite material having a reinforcing carbon fiber volume fraction of 53 to 65 % is molded, the composite material satisfies at least two of the following properties:

(a) a compressive strength at a room temperature after impact at an impact energy of 6.67 J/mm determined by a method defined in SACMA-SRM-2R-94 is 240 MPa or more; and

(c) a 0° compressive strength at a room temperature determined by a method defined in SACMA-SRM-1R-94 is 1,350 MPa or more, and a 0° compressive strength at a high temperature after a hot/wet conditioning determined by the method is 1,100 MPa or more

By comparing the above-described results with those from Example 7, the Applicants respectfully submit that mechanical properties balanced at a high level as described in amended Claim 15 (and Claim 22) cannot be obtained by the polymer disclosed in Nishimura '506. Using the Nylon 12 of Nishimura '506 produces results that do not read on the elements of amended Claim 15. Therefore, the Applicants respectfully submit that even assuming *arguendo* that one skilled in the art would combine Nishimura '506 and Isley, the combination does not disclose every element of amended Claim 15.

In addition, the rejection concedes that Nishimura '506 fails to disclose that the resin is comprised of thermoplastic polyetherimide, polyphenyleneether or polyethersulfone. Nevertheless, it finds that Yamanaka, Noland and Voirol disclose these elements and it would have been obvious to one skilled in the art to combine these references with Isley and Nishimura. In addition, the rejection finds that regardless of whether Yamanaka, Noland and Voirol disclose a resin comprised of thermoplastic polyetherimide, polyphenyleneether or polyethersulfone, it would have been obvious to one skilled in the art to make the resin from any "suitable" thermoplastic resin material such as the aforementioned. No documentary evidence is provided to support this finding.

First, Yamanaka, Noland and Voirol, disclose merely examples of using PES, etc. as the matrix resin, and it is not disclosed that a thermoplastic resin material is employed on the surface

of a substrate in the system using a thermosetting resin as the matrix resin. In vacuum assisted injection molding, it is known to one skilled in the art that it is necessary to use a matrix resin having a low viscosity at the temperature of injection at which the resin to be injected is not decomposed, and that it is impossible to use a thermoplastic resin (PES, etc), which is used for interlamina-toughening in the Applicants' claims and whose melting point is high because of its high thermal resistance, as a matrix resin. Thus, it is impossible to impregnate PES, etc. into the preform by vacuum assisted injection molding. It can, therefore, be further seen that one skilled in the art would not make the hypothetical combination of Yamanaka, Noland or Voirol with Lewis, Nishimura '506 and Isley and that these references do not disclose the elements of Claim 15.

Second, Official notice without documentary evidence, to support an Examiner's conclusion, is permissible only when the facts asserted to be well-known or common knowledge in the art are capable of *instant and unquestionable demonstration* as being well-known. *In re Ahlert*, 424 F.2d 1088, 1091 (CCPA 1970) (emphasis added). It is *never* appropriate to rely solely on "common knowledge" in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based. *Zurko*, 258 F.3d at 1385. Rather, alleged common knowledge in the art may be relied upon only with respect to "peripheral issues." *Id.* at 1385-86. As the court held in *Zurko*, an assessment of basic knowledge and common sense that is not based on any evidence in the record lacks substantial evidence support. *Id.* at 1385, 59 USPQ2d at 1697.

The Applicants respectfully submit that it would have been anything but obvious to one skilled in the art to make the resin from any "suitable" thermoplastic resin material. It cannot be shown that this is capable of instant and unquestionable demonstration as being well-known.

Further, Claims 22 and 46 depend from Claim 15 and, therefore, are allowable. For the foregoing reasons, the Applicants respectfully request reconsideration and withdrawal of the obviousness rejection of Claims 15, 22 and 46.

Claims 16 and 17 stand rejected under 35 U.S.C. §103 over the further hypothetical combination of Nishimura '160 with the references mentioned above with respect to Claims 15 and 22. The Applicants respectfully submit that Nishimura '160 does not provide further teachings or suggestions that would cure the deficiencies set forth above.

Claim 18 stands rejected under 35 U.S.C. §103 over the further hypothetical combination of Bokrath with the references mentioned above with respect to Claims 15 and 22. The Applicants respectfully submit that Bockrath does not provide further disclosure that would cure the deficiencies set forth above.

Claim 19 stands rejected under 35 U.S.C. §103 over the further hypothetical combination of Heck with the references mentioned above with respect to Claims 15 and 22. The Applicants respectfully submit that Heck does not provide further disclosure that would cure the deficiencies set forth above.

Claims 15-17, 22 and 46 stand rejected under 35 U.S.C. §103 over the combination of Yamanaka, Noland or Voirol with Lewis, Isley, Nishimura '506 and Nishimura '160. The Applicants have already established that combining Nishimura '160 with Yamanaka, Noland or Voirol and Lewis with Nishimura '506 and Isley is inapplicable to those claims. Accordingly, the Applicants respectfully submit that a mere rearrangement of the pieces forming the rejection does nothing to cure the deficiencies set forth above with respect to the earlier combination. Therefore, the Applicants respectfully submit that this reworked combination is inapplicable to Claims 15-17, 22 and 46.

Claim 18 stands rejected under 35 U.S.C. §103 over the combination of Bockrath with Yamanaka, Noland or Voirol and Lewis, Isley, Nishimura '506 and Nishimura '160. The Applicants respectfully submit that the rejection is inapplicable for the same reasons set forth above with the earlier arrangement as it applied to Claim 18. Withdrawal of the rejection is respectfully requested.

Claim 19 stands rejected under 35 U.S.C. §103 over the combination of Heck with Yamanaka, Noland or Voirol and Lewis, Isley, Nishimura '506 and Nishimura '160. The Applicants respectfully submit that the rejection is inapplicable for the same reasons set forth above with the earlier arrangement as it applied to Claim 18. Withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



T. Daniel Christenbury
Reg. No. 31,750
Attorney for Applicants

TDC/vp
(215) 656-3381